
Operating instructions and spare parts list

MultiTronic Powder gun control unit (CG04 type) MultiAir Control unit



Translation of the original operating instructions

Documentation MultiTronic CG04/MultiAir

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Gema Switzerland GmbH
Mövenstrasse 17
9015 St. Gallen
Switzerland

Phone: +41-71-313 83 00
Fax.: +41-71-313 83 83

E-Mail: info@gema.eu.com
Homepage: www.gemapowdercoating.com

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the MultiTronic CG04/MultiAir Control unit.

These safety regulations must be read and understood before the MultiTronic CG04/MultiAir Control units used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

**DANGER!**

Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

**WARNING!**

Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment



**INFORMATION!**

Useful tips and other information

Conformity of use

1. The MultiTronic CG04/MultiAir Control unit is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.
2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the MultiTronic CG04/MultiAir Control unit is to be used for other purposes or other substances outside of our guidelines then Gema Switzerland GmbH should be consulted.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The MultiTronic CG04/MultiAir Control unit should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.
4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the MultiTronic CG04/MultiAir Control unit has been set up and wired according to the guidelines for machinery (2006/42 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to MultiTronic CG04/MultiAir Control unit exempts the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore the country-specific safety regulations must be observed.

Explosion protection	Protection type	Temperature class
 	IP54	T6 (zone 21) T4 (zone 22)

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Improper use of the controlling device can lead to accidents, malfunction or damage to the control itself.
2. Before every start-up check the equipment for operational safety (regular servicing is essential)!
3. Safety regulations BGI 764 and VDE regulations DIN VDE 0147, part 1, must be observed for safe operation.
4. Safety precautions specified by local legislation must be observed.
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.

7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during operation. Safety precautions specified by local legislation must be observed!
8. Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
9. If Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!
11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!
12. As a general rule for all powder coating installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder coating installations!



WARNING!

We emphasize that the customer himself is responsible for the safe operation of equipment. Gema is in no way responsible for any resulting damages!

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder coating equipment must have read and understood the operating instructions and the "Safety regulations"-chapter. The operator must ensure that the user has had the appropriate training for powder coating equipment and is aware of the possible sources of danger.

The control devices for the spray guns must only be set up and used in zone 22. Only the spray gun should be used in zone 21.

The powder coating equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder coating equipment is to be avoided.

2. The operator should care about no non-authorized personnel works on the powder coating equipment (e.g. this also includes using the equipment for non-conform work).
3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.
4. The operator is under obligation to check the powder coating equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.
5. The operator is obliged to check that the powder coating equipment is only operated when in satisfactory condition.
6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder coating equipment.
8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. The powder spraying device must be turned off while servicing is carried out. The operator must train and commit the responsible personnel to this.
9. Activities such as checking powder fluidization or checking the high voltage spray gun etc. must be carried out with the powder coating equipment switched on.

Notes on special types of hazard

Power

It is necessary to refer once more to the danger of life from high voltage current if the shut-down procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying device is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see chapter "Grounding/Earthing".

Grounding/Earthing

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, part 102) must be earthed 1.5 meters either

side and 2.5 meters around each booth opening. The earthing resistance must amount to maximally 1 MOhm. The resistance must be tested on a regular basis. The condition of the machinery surroundings as well as the suspension gear must ensure that the machinery remains earthed. If the earthing of the machinery includes the suspension arrangements, then these must constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace in order to check the earthing.

Compressed air

When there are longer pauses or stand-still times between working, the powder coating equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted so that there are additional measures such as barriers to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to machines

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder coating equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original Gema replacement parts should be used. Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The Gema Switzerland GmbH guarantee would no longer be valid.

Safety requirements for electrostatic powder coating

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrostatic conductive parts, in particular the machinery within 5 meters of the coating equipment, must be earthed.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).
4. The operating personnel must wear electricity conducting footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.

6. The supplied earthing cable (green/yellow) must be connected to the earthing screw of the electrostatic powder spraying hand appliance. The earthing cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain and with the suspension arrangement of the objects.
7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating device may only be switched on once the booth has been started up. If the booth cuts out then the powder coating device must be switched off.
9. The earthing of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked on a weekly basis. The earthing resistance must amount to maximally 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturers instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m³ should be used.

A summary of the rules and regulations

The following is a list of relevant rules and regulations which are to be observed:

Guidelines and regulations, German professional association

BGV A1	Prevention principles
BGV A2	Electrical equipment and material
BGR 132	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging

EN European standards

RL94/9/EC	The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres
EN 292-1 EN 292-2	Machine safety ²⁾
EN 50014 until EN 50020, identical: DIN VDE 0170/0171	Electrical equipment for locations where there is danger of explosion ³⁾
EN 60529, identical: DIN 40050	IP-Type protection: contact, foreign bodies and water protection for electrical equipment ²⁾
EN 60204 identical: DIN VDE 0113	VDE regulations for the setting up of high voltage electrical machine tools and processing machines with mains voltages up to 1000 V ³⁾

VDE (Association of German Engineers) Regulations

DIN VDE 0100	Regulations for setting-up high voltage equipment with mains voltages up to 1000 V ⁴⁾
DIN VDE 0105, part 1	VDE regulations for the operation of high voltage equipment ⁴⁾ General regulations
DIN VDE 0147, part 1	Setting up stationary electrostatic spraying equipment ⁴⁾
DIN VDE 0165	Setting up electrical equipment in locations in areas with danger of explosion ⁴⁾

Sources:

¹⁾ Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association

²⁾ Beuth Verlag GmbH, Burggrafenstrasse 4, 1000 Berlin 30

³⁾ General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee

⁴⁾ VDE Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12

Product specific security measures

- The installation work, to be done by the customer, must be carried out according to local regulations
- Before starting up the plant a check must be made that no foreign objects are in the booth or in the ducting (input and exhaust air)
- It must be observed, that all components are grounded according to the local regulations, before start-up

About this manual

General information

This operating manual contains all the important information which you require for the working with the MultiTronic CG04/MultiAir. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun control units, powder guns etc. - should be referenced to their corresponding documents.

Function description

Field of application

The MultiTronic CG04 Control unit is an intelligent gun control, which permits to control completely up to 10 powder guns at the same time.

The MultiTronic CG04 Control unit is composed of a control unit for the high voltage generation. The separate MultiAir Control unit is used for the air technology.

MultiTronic CG04 Control unit - description

The MultiTronic CG04 Control unit controls the max. number of 10 powder coating guns. The control unit contains all controlling and checking functions required for operating the powder gun.

All coating parameters (preset values and actual values) have their individual display and input unit to allow the highest user-friendly operation.



MultiTronic CG04 Control unit - description

Up to 255 coating programs can be stored and recalled instantly. The stored programs help considerably to increase the repeatability of uniform coating results and the quality at any time.

The powder volume is set independent from the total air volume. The allotment of conveying air supplementary air takes place automatically. The components needed for it are integrated in the MultiAir Pneumatic control unit.

By freely selectable high voltage or spray current for all guns at the same time, optimum high voltage generation is guaranteed, also for the highest application demands. Various diagnostic functions, indicated by LEDs and displays, increase the process reliability and make operation easier.

Characteristics

The most important characteristics of the MultiTronic CG04 Control unit are:

- 255 stored coating programs possible. Possible settings for every coating program, valid for all guns at the same time:
- High voltage (kV)
- Spray current (μA)
- Electrode rinsing air (Nm^3/h)
- Powder output (%)
- Total air volume (conveying air/supplementary air in Nm^3/h)
- Individual input and display unit for high voltage, spray current, electrode rinsing air, powder output, total air volume and programs
- Diagnostic functions
- Power supply (100-240 VAC)
- DigitalBus (parallel interface to PLC)
- Online controlling of all coating parameters:
- Gun - high voltage/spray current/electrode rinsing air
- Injector - powder output/total air (conveying air and supplementary air)
- Controlling of up to 255 peripheral stored coating programs in the MultiTronic Control unit

MultiAir Pneumatic control unit - description

The MultiAir Pneumatic control unit permits the controlling of up to 10 injectors. The total air volume, the powder output and the electrode rinsing air are set with the MultiTronic Control unit.

Some electropneumatically pressure regulating valves control correctly the adjusted values. An integrated pressure sensor monitors the input pressure and assures an optimal coating result with every input pressure. A main solenoid valve switches on/off the air for the powder output for 10 powder guns.



MultiAir Pneumatic control unit - description

Technical Data

MultiTronic CG04 - basis device

Electrical data

MultiTronic CG04	
Nominal input voltage	230-240 VAC (110-120 VAC)
Tolerance	+/-10%
Frequency	50/60 Hz
Input power	300 VA
Protection type	IP54
Temperature range	+10°C - +40°C (+50°F - +104°F)

Connectable electrostatic guns

MultiTronic CG04	
Automatic guns	OptiGun GA02 / PG2-A
Nominal output voltage	10 V / 17 kHz / 1.2 A
Tribo guns	Connection is possible

Dimensions

MultiTronic CG04	
Width	425 mm
Depth	370 mm
Height	180 mm
Weight	10.9 kg

MultiAir - air control unit

Electrical data

MultiAir	
Nominal input voltage	230-240 VAC (110-120 VAC)
Tolerance	+/-10%
Frequency	50/60 Hz
Input power	200 VA
Protection type	IP54
Temperature range	+10°C - +40°C (+50°F - +104°F)

Pneumatic data

MultiAir	
Input pressure	6.5-9 bar
Max. water vapor content of the compressed air	1.3 g/m ³
Max. oil vapor content of the compressed air	0.1 mg/m ³
Max. compressed air consumption	90 m ³ /h (dependent on the number of guns)

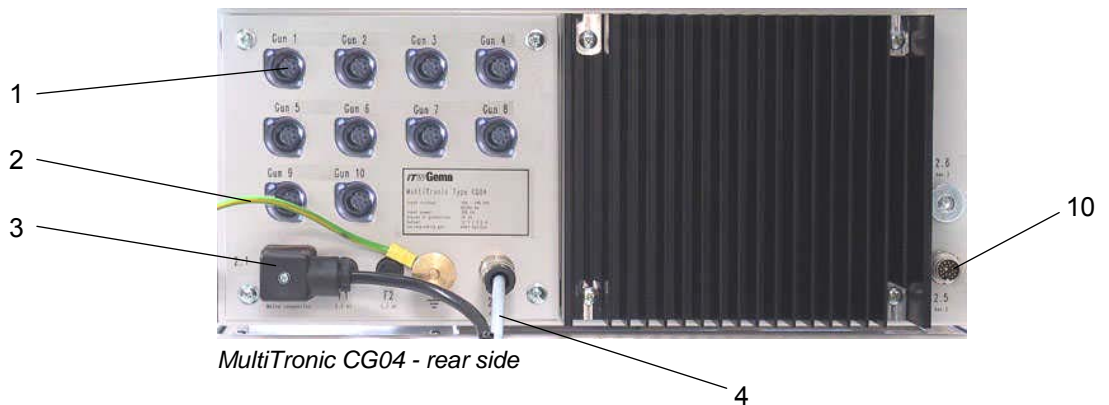
Dimensions

MultiAir	
Width	425 mm
Depth	315 mm
Height	180 mm
Weight	17.2 kg

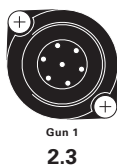
Start-up

MultiTronic CG04 - plugs and connections

The MultiTronic CG04 and MultiAir Control units are supplied ready for use by the manufacturer. Just a few cables and hoses must be connected by the customer.



- | | | | |
|---|------------------|----|---------------------|
| 1 | Gun connection | 4 | MultiAir connection |
| 2 | Grounding | 10 | PLC connection |
| 3 | Mains connection | | |



Gun connection (2.3 - Gun1)

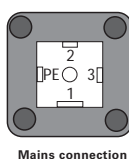
Connect the gun cable with the 7-pin plug to the **Gun 1 until Gun 10** socket (always begin with **Gun 1**) on the rear side of the control unit.

Gun type: OptiGun **GA02 / PG2-A** (optional)



Grounding

Connect the grounding cable with the grounding screw to the control unit and fasten the 5 m long grounding cable with the clamping pliers to the booth or the workpiece hangers.



Power supply (2.1 - Mains connection)

Connect the power supply cable to the socket **2.1 - Mains connection**. This plug may be never connected under tension!



2.4
Aux 1

MultiAir connection (2.4 - Aux 1 socket)

The internal MultiAir Control unit communication is done by this 12-pin socket.



2.5
Aux 2

PLC connection (2.5 - Aux 2 plug)

A superordinated control unit (PLC) is connected with this 19-pin plug by parallel interface.

MultiAir - plugs and connections



MultiAir - rear side

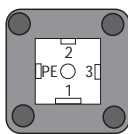
- | | | | |
|---|---------------------------|---|-------------------------------|
| 4 | MultiTronic connection | 7 | Conveying air connections |
| 5 | Mains connection | 8 | Supplementary air connections |
| 6 | Compressed air connection | 9 | Rinsing air connections |



2.4
Aux 1

MultiTronic connection (2.4 - Aux 1 plug)

The internal communication to the MultiTronic Control unit is made by the 12-pin plug.



Mains connection

2.1

Power supply (2.1 - Mains connection)

Connect the power supply cable to the socket **2.1 - Mains connection**. This plug may be never connected under tension!

Compressed air connection (1.1 IN)

The hose of the compressed air supply from the compressed air circuit is connected directly to the rear side of the control unit (hose inside diameter 16 mm).



Attention:

The compressed air input pressure must be 6.5 bar during operation and should not surmount 9 bar!

The compressed air must be free of oil and water!

Conveying air connection



Connect the red hose for the conveying air to the corresponding connection on the injector.

Supplementary air connection



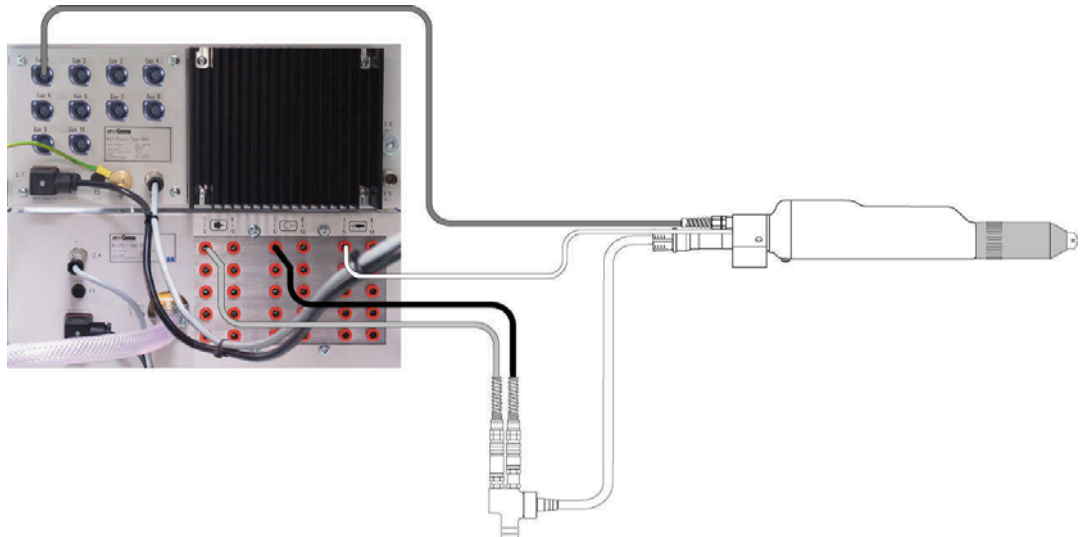
Connect the black hose for the supplementary air to the corresponding connection on the injector.

Rinsing air connection



Connect the hose for the rinsing air to the electrode rinsing air output and to the powder gun.

Pneumatic connection of the gun



Pneumatic connection of the gun

Function description

The pneumatic functions for powder output are controlled by the MultiAir Pneumatic control unit. Press the main switch for start-up.

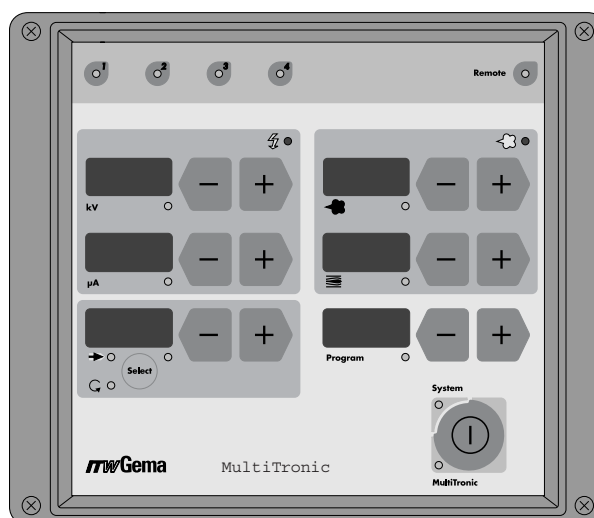
The MultiTronic CG04 Control unit carries out all control functions.

Operation

MultiTronic CG04 - function description

Front panel

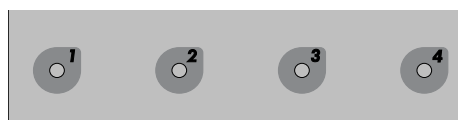
The MultiTronic CG04 Control unit has for each coating parameter its own display and its own operating panel.



MultiTronic CG04 - front panel

Diagnostic LEDs

The diagnostic LEDs indicate the equipment faults. The MultiTronic CG04 Control unit is functioning correctly when the **diagnostic LEDs 1, 2, 3 and 4** are illuminated in green.



MultiTronic CG04 - diagnostic LEDs



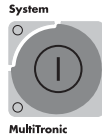
Note:

If any of the diagnostic LEDs does not illuminate, please contact an Gema service center!

Signification of the diagnostic LEDs:

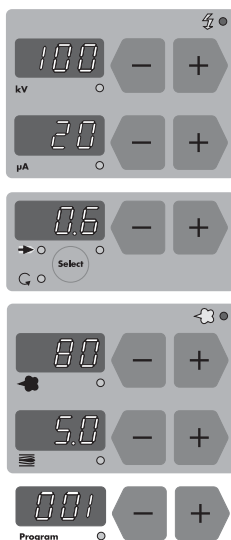
1 (green)	Power supply +24 VDC, MultiAir ready for operation
2 (green)	Internal power supply +15 VDC ready for operation
3 (green)	Interne power supply +5 VDC ready for operation
4 (green)	Main solenoid valve in the MultiAir ready for operation

Main switch



The main switch allows to activate the control unit. If the control unit is activated, the green **MultiTronic** LED (lower left) is illuminated. In addition, if the green **System** LED (upper left) is illuminated, the equipment is released for coating operation by the external control unit.

Displays



- **kV** display and setting of high voltage (setting range 0-100 kV)
- **μA** display and setting of spray current (setting range 0-100 μA)
- **Electrode rinsing air** display and setting of the electrode rinsing air output (setting range 0-2.8 Nm³/h, default value: 0.2 Nm³/h), **Select** key is not used
- **Powder output** display and setting of the powder output (setting range 0-100 %)
- **Total air volume** display and setting of the total air volume (setting range 1.8-8.0 Nm³/h)
- **Program** display and setting of the program number (setting range 1-255), as well as fault message display and fault message acknowledgement

Display LEDs



This LED (red) illuminates when there is a fault in the high voltage system



This LED (red) illuminates when there is a fault in the pneumatic system of the MultiAir Control unit

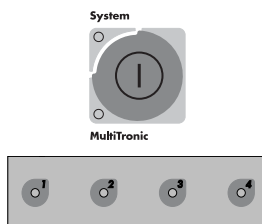


This LED (green) illuminates when the control unit is remote-controlled by a superordinated control unit (PLC)

Special functions

Various device settings are made in the special function mode. Following settings are available:

- System parameters
- Powder output correction
- Software version



Entering the special functions mode

Press the **main switch** for approx. 10 seconds until the displays no longer illuminate.

In the special functions mode, all green **diagnostic LEDs** should illuminate. If not, see "Diagnostic LEDs".



Exiting the special functions mode

The special functions mode will be terminated by pressing shortly the **main switch**.

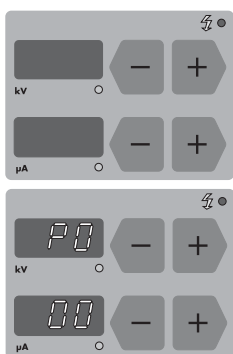


System parameter mode

In the system parameter mode, all system parameter can be edited and their values can be adjusted.

Procedure:

1. Press the **main switch** for approx. 10 seconds until the displays no longer illuminate
2. Enter the system parameter mode by pressing the corresponding **+** or **-** key in the **kV** or **μA** display area
3. Select the system parameter (**P00-P08/PE/PL**) by pressing the **+** or **-** key
4. Adjust the system parameter value with the **+** or **-** key (see therefore chapter "System parameters")
5. The special parameter mode can be exited by pressing the **main switch**



Note:

The system parameter table will be found in the chapter "Technical appendix"!

Powder output correction mode

The MultiTronic CG04 Control unit permits the adaptation of differing powder outputs in the plant, caused by differing powder hose designs and lengths to the individual guns. The minimum powder output (**FL_min**) and the maximum powder output (**SKW%**) can be adapted with two parameters.



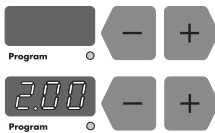
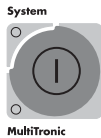
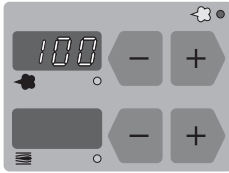
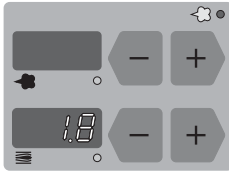
Note:

Powder output corrections are made at the first start-up, after servicing, after application problems or by using hoses with different diameters to that used previously!



Procedure:

To enter the powder output correction mode, press the **main switch** (for approx. 10 seconds), until the displays no longer illuminate.



1. The value for minimum powder output (**FL_min**) is set with the **+** or **-** keys in the display area
2. The value for maximum powder output (**SKW%**) is set with the **+** or **-** keys in the display area
3. Exit the special functions mode by pressing the **main switch**

Software version

1. To verify the software version of the MultiTronic CG04 operating system, press the **main switch** for approx. 10 seconds, until the displays no longer illuminate
2. The software version number will be shown by pressing the **+** or **-** key in the **Program** display area
3. The software version number of the MultiTronic operating system is displayed
4. The special functions mode can be terminated by pressing the **main switch**

System reset

A system reset will be carried out at the first start-up and if function faults occur.



Attention:

A system reset overwrites the programs 1-255 with default values and returns the system parameters to their original factory settings!

1. Switch off the MultiTronic CG04 Control unit with the **main switch**
2. Hold the **main switch** pressed and switch on the **power supply switch**. After approx. 15 seconds, the actual program numbers 1-255 appear in the **Program** display and the programs are individually reset to the factory default values. The **main switch** only has to be pressed until the program numbers start to run through in rapid succession in the display



Note:

Fault diagnostic LED 4 does not illuminate during system reset!

After a **system reset**, the system parameters must be verified for their correctness!

Abbreviations

EL	Electrode rinsing air
FL	Conveying air
ZL	Supplementary air
FL_min	Minimum powder output
SKW%	Correction value

Technical appendix

General information

In this chapter, you will find further information about operation, connections and different diagrams.

System release and powder coating

For technical safety reasons, the MultiTronic CG04 Control unit should only be released after fulfilling all the required safety conditions (e.g. fire protection). The release will be activated by the input 3 (**2.1 Mains connection**).

- Connection no. 3, system release - **System** LED illuminates green
- Control voltage - 100-240 VAC

The MultiTronic CG04 Control unit is ready for coating operation:

- The MultiTronic CG04 Control unit is selected - **MultiTronic** LED illuminates green
- Control voltage for system release is present - **System** LED illuminates green
- Automatic powder gun is connected - powder output takes place

The system release can also take place by the parallel interface **AUX2 - 2.5**, see therefore chapter "DigitalBus parallel interface".

System parameters

System parameters - display







Parameter (P00-P09/PE/PL)

Values

Abbreviations

EL	Electrode rinsing air
FL	Conveying air
ZL	Supplementary air
FL_min	Minimum powder output
SKW%	Correction value

System parameters - description

Designation	Description	Value	Remark
P0	Number of guns	10 = 10 guns (1-10)	Always beginning with connector no. 1
P1	Gun type	0 = Gun type OptiGun GA02 / PG 1 = Tribo gun	Gun type selection No kV value displayed in normal mode
P2	Gun test	0 = Gun test not activated 1 = Gun 1 Test 2 = Gun 2 Test N = Number of guns according to P0	Parameter for separate high voltage control In normal mode P2=0
P3	Injector type	Nozzle Ø in mm (FL=1.6 / ZL=1.4) 0 = P13	Injector type selection Ø 1.6 mm with notch, select injector nozzle and throttle for the corresponding injector type
P4	not used		
P5	not used		
P6	Communication	0 = DigitalBus 1 = CAN	Initialization Communication
P7	Display options	0 =  PA%,  = GL m³/h 1 =  FL m³/h,  = GL m³/h	Standard display Indication of conveying air and total air Indication of air volumes for checking purposes
P8	Tolerance band	0 = 0.05 m³/h 1 = 0.1 m³/h 2 = 0.2 m³/h	Tolerance band for air volume regulation
P9	Tolerance band error message	1 = 0.3 bar 2 = 0.2 bar 3 = 0.3 bar 4 = 0.4 bar	Calculated air volume in Nm³/h
PE	not used		
PL	not used		

Default values are marked by **bold print**

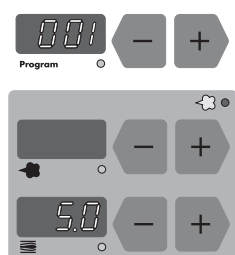
Powder output correction

The minimum powder output of all guns can be set with the powder output correction.






Note:

By carrying out the layout of the powder hoses, please consider that all of them have the same length!



Procedure

1. Select program number **001** on the program display
2. Adjust the total air volume to **5.0 Nm³/h** on the  display, if not already set. Adjust the powder output to **00 %** on the  display
3. To enter the special function mode, press the **main switch** for approx. 10 seconds, until all displays no longer illuminate
4. Set the minimum powder output value in such a way, that all guns have the same little powder output
5. Set the maximum powder output correction value (**SKW%**) to **100 %** on the  display
6. Exit the special function mode by pressing the **main switch**

Daily correction value for powder output

The daily correction value for powder output can be set through the Digital-Bus with the PLC control unit. The daily correction value is addressed with the identification number 7. The value range is between 50-150 %.

This means, that the actual powder output value is multiplied by the correction value X (e.g. powder output value PA% = 50 %, daily correction value = 60 %) corresponds to the new powder output value of 30 % (50x0.6 = 30). The values outside this value range are rejected with the error message **H31**.

If the correction value, multiplied by the powder output preset value, is higher than 100%, the output is limited automatically to 100% and displayed with the error message **H09**. This verification takes place at program changes and when a new correction value is set.

By switching on the equipment, the correction value is 100%. The correction value will not be saved in the EEPROM. After each start-up, the PLC control unit must associate the daily correction value to the MultiTronic Control unit. The daily correction value for powder output can be displayed on the MultiTronic CG04 Control unit.

Displaying the correction value

Press the **MultiTronic** key and hold it, then press **POWDER KEY +** or **POWDER KEY -**. The value will be displayed, until no key is pressed anymore. All displays are not illuminated, except the powder output display with the daily correction value.

Error messages

General information



If an error occurs in the system, the cause must be eliminated first, before further operation is possible. If the cause has been eliminated, this must be acknowledged by pressing the + or - key.

Error description

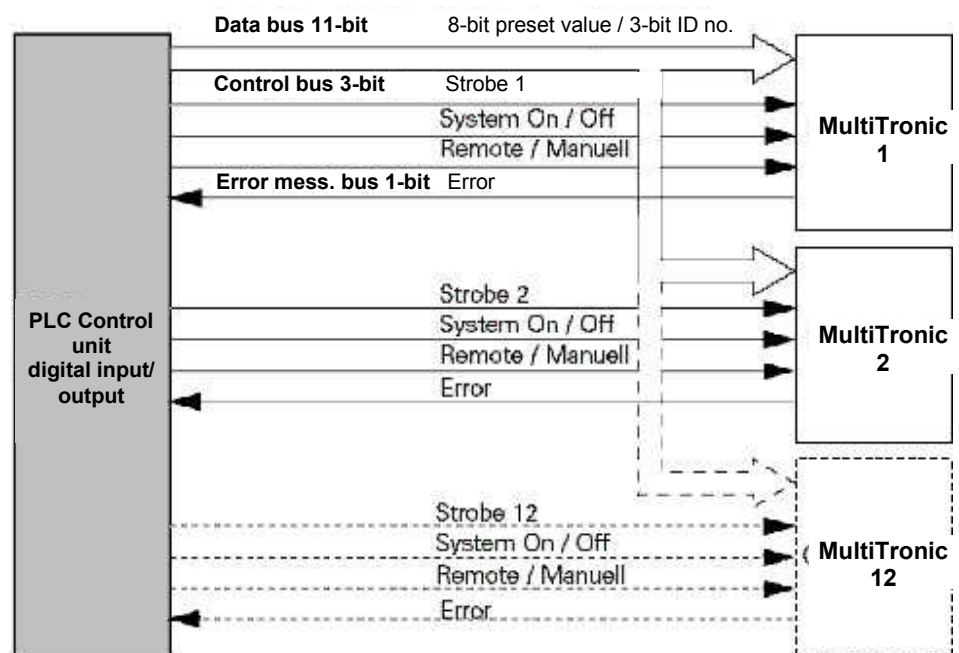
Error message	Error description
Pneumatics:	
H02	Error on pressure regulator for conveying air <ul style="list-style-type: none"> - Check the conveying air hose to the injector - Disconnect the conveying air hose of the MultiAir Control unit and acknowledge the error - Contact an Gema service center
H03	Error on pressure regulator for supplementary air <ul style="list-style-type: none"> - Check the supplementary air hose to the injector - Disconnect the supplementary air hose of the MultiAir Control unit and acknowledge the error - Contact an Gema service center
H04	Error on pressure regulator for rinsing air
H06	Error on main solenoid valve <ul style="list-style-type: none"> - Connecting cable from main solenoid valve to basic electronics is missing - Check main solenoid valve
H07	The desired supplementary air volume is too large (ZL_max.) <ul style="list-style-type: none"> - Decrease the programmed value for the total air volume and/or increase the programmed value for the powder output volume
H08	The desired conveying air volume is too large (FL_max.) <ul style="list-style-type: none"> - Decrease the programmed value for the total air volume and/or decrease the programmed value for the powder output volume
H09	The daily correction value multiplied by the powder output preset value is larger than 100 % <ul style="list-style-type: none"> - Acknowledge the error and decrease the daily correction value by PLC

Error message	Error description
High voltage:	
H10-H19	High voltage error gun 1-10 <ul style="list-style-type: none"> - Check the basic electronics and the gun. Check the gun cable for breaks - Replace the gun
General information:	
H20	Check the 15 VDC power supply in the MultiTronic <ul style="list-style-type: none"> - The input voltage is higher than the nominal voltage 15 VDC +10%
H21	Check the 15 VDC power supply in the MultiTronic <ul style="list-style-type: none"> - The input voltage is lower than the nominal voltage 15 VDC -10%
H22	Power supply 24 VDC error in the MultiAir <ul style="list-style-type: none"> - Contact an Gema service center
H23	EEPROM error <ul style="list-style-type: none"> - Contact an Gema service center
H24	Timeout writing EEPROM <ul style="list-style-type: none"> - Contact an Gema service center
H25	Display of single gun test (system parameter P2 > 0)
DigitalBus:	
H30	Data validation error <ul style="list-style-type: none"> - Selection fault of the superordinated control (PLC). Set the PLC program correctly
H31	Preset value not within the value range <ul style="list-style-type: none"> - Selection fault of the superordinated control (PLC). Set the PLC program correctly

DigitalBus parallel interface

Function

The MultiTronic CG04 Gun control unit is connected to a superordinated control unit by DigitalBus. The DigitalBus has a 16 bit parallel interface. The interface consists of 14 digital inputs and 1 digital output. The digital inputs are subdivided into a data bus, consisting of 11 bits and a control bus, consisting of 3 bits. The digital output is an error message bit.



DigitalBus - connection to a superordinated control unit

Data bus

The data bus width is 11 bits. The first 8 bits are used to transfer the data for the different operating parameters (preset values) to the control unit. The data for the corresponding preset values (powder output, total air, electrode rinsing air, high voltage limitation value, current limitation value, program number) are assigned with an identification number, consisting of 3 bits.

Data transmission (bit 1-8)

Binary values	Designation	Value range	Resolution
Bits 1-8 Bin. value $2^0 \cdot 2^7$ (see "DigitalBus - 19-pin socket - Aux. - 2.5")	PA (%)	0-100	1
	GL (m ³ /h)	1.8-8	0.1
	EL (m ³ /h)	0-2.8	0.1
	not used		
	HV_BG (kV)	0-100	1
	I_BG (μA)	0-100	1
	Program no. PGN	1-255	1
	Daily correction of powder output (%)	50-150	1

Data identification (bit 9-11)

Identification number 3 bits (binary code)	Allocation
0	PA (%)
1	GL (m ³ /h)
2	EL (m ³ /h)
3	not used
4	HV_BG (kV)
5	I_BG (μA)
6	Program no. PGN
7	Daily correction of powder output (%)

Abbreviations

EL	Electrode rinsing air
GL	Total air
HV_BG	High voltage limitation
I_BG	Current limitation
PA	Powder output

Control bus

The control bus consists of 3 bits.

Strobe	Activate data transfer
System On/Off	MultiTronic system release
Remote/manual	Operating mode

Digital output of composite error message

The composite error message **Error** shows all errors, which are present in the control unit.

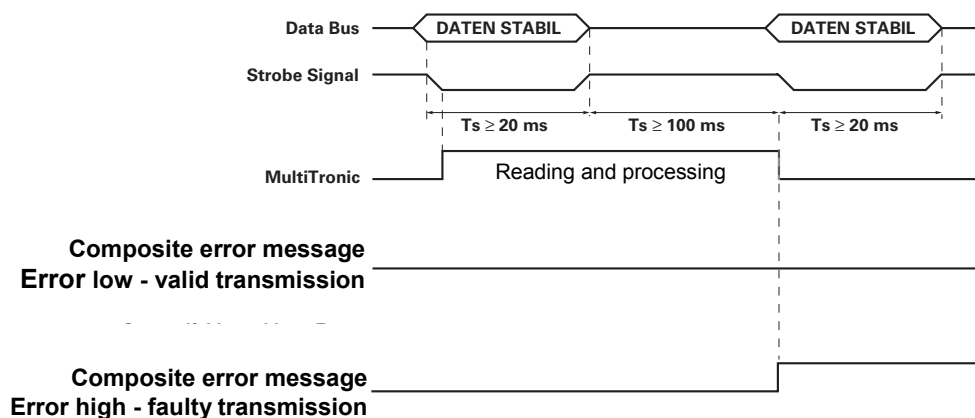
Digital output	Error = high	Composite error control unit
----------------	--------------	------------------------------

Bus control

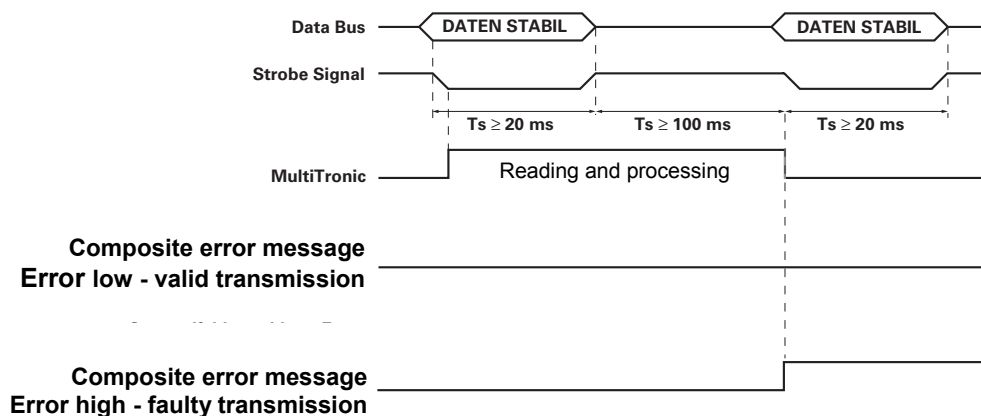
The data transmission from a superordinated control unit (PLC) to the gun control unit takes place by the data bus (11 bits) and the control bus (3 bits). All preset values can be transmitted in binary code with the first 8 bits (bit 1-8) of the data bus (value range 0-255). The identification number is transmitted in binary code with the last 3 bits (bit 9-11) of the data bus (value range 0-7). The data transfer from the data bus is initiated by a negative flank of the **Strobe** control signal.

Control sequence

Control sequence for program number change (identification number 6)



Control sequence for program parameter (identification number 0-5)



Software description

Function

The software provides a strobe signal and an error signal for each MultiTronic CG04 Control unit. The data signals and the identification number signals are used in common for all MultiTronic CG04 Control units. The MultiTronic CG04 Control unit takes over the data with the negative flank of the strobe signal.

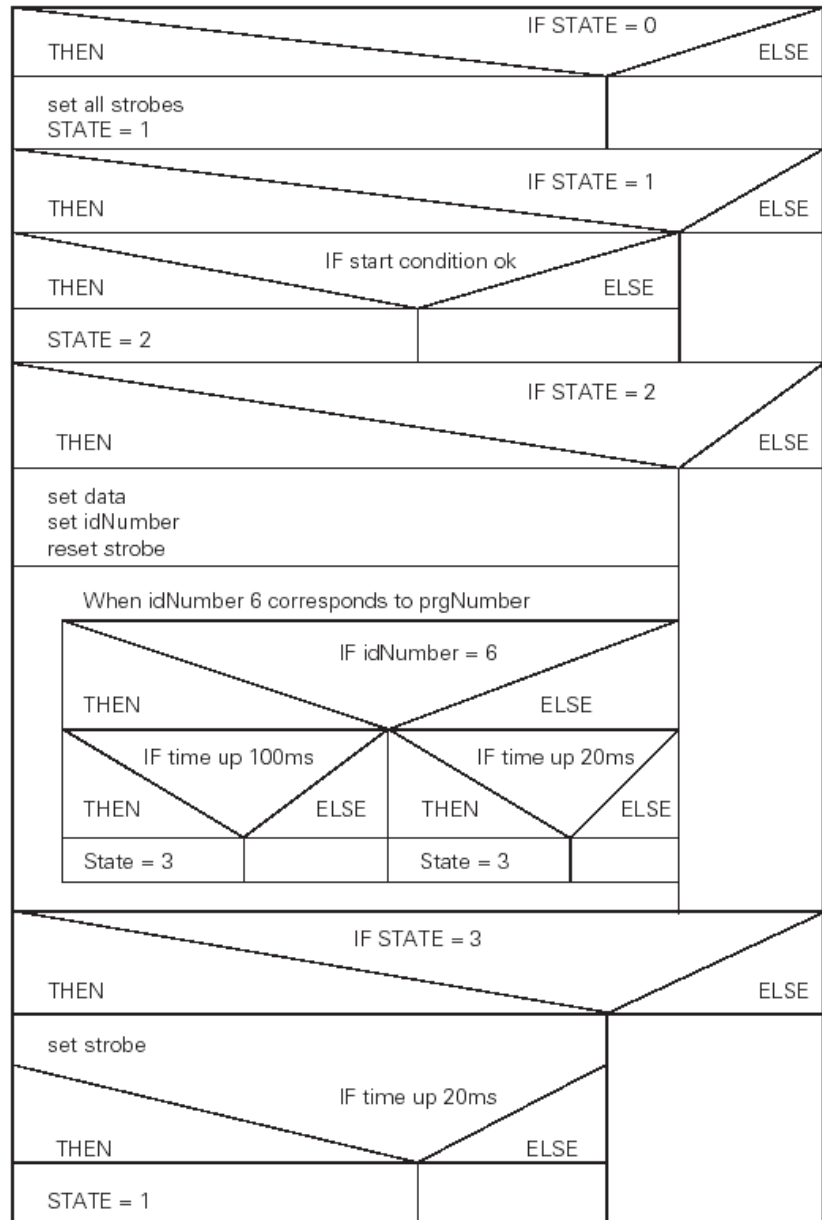
Explanation:

The simultaneous transmission of identical data to all MultiTronic units only occurs on the negative flank of all strobe signals.

An example of a PLC program is shown on the following page:

Program procedure diagram

BEGIN



END

Program procedure diagram

Guide values for application

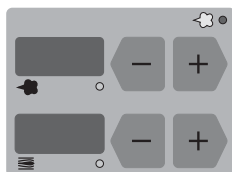
General information



All values in these tables are guide values. Differing environmental conditions, wear and different powder types can change the table values.

General conditions for PI 3 injectors

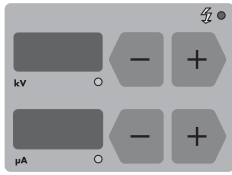
Powder type	Epoxy/Polyester
Powder hose length (m)	10
Powder hose Ø (mm)	11
Input pressure (bar)	5.0
Conveying air nozzle (mm)	1.6
Supplementary air nozzle Ø (mm)	1.4

Guide values for MultiTronic with PI 3 injectors



Total air 		4 Nm ³ /h	5 Nm ³ /h	6 Nm ³ /h
		Powder output (g/min)		
Powder output  (%)	10	30	35	45
	20	60	75	90
	30	85	100	120
	40	110	130	150
	50	130	160	175
	60	150	180	210
	70	175	200	235
	80	200	240	270
	90	215	260	
	100	235	290	

Guide values for spray current limitation



The spray current limitation permits:

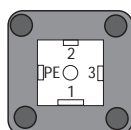
- Greater stability for the coating process
- Constant current values, because only the high voltage varies
- Larger reproducibility of coating results

The spray current is displayed in the **µA** window and can be adjusted with the **+** or **-** keys (setting range 0-100 µA).

High voltage	with SuperCorona	without SuperCorona
100 kV	Flat parts - 50 µA (±20)	Flat parts - 15 µA (±10)
100 kV	Profiles - 60 µA (±10)	Profiles - 25 µA (±5)
100 kV	Repairs - 20 µA (±10)	Repairs - 5 µA (±5)

Pin allocations

Mains cable socket



Mains connection

2.1

Pin	Function
1	Neutral conductor (power supply)
2	Phase conductor (power supply)
3	System ON/OFF (gun release) 100-240 VAC
PE	Grounding PE

Gun 1 - Gun 10 (OptiGun GA02/PG1-A/PG2-A gun plug)

Pin	Function
1	GND of high voltage cascade
2	not used
3	not used
4	not used
5	not used
6	Signal of high voltage cascade
7	Grounding PE

2.4 Data I/O socket (communication to MultiAir)

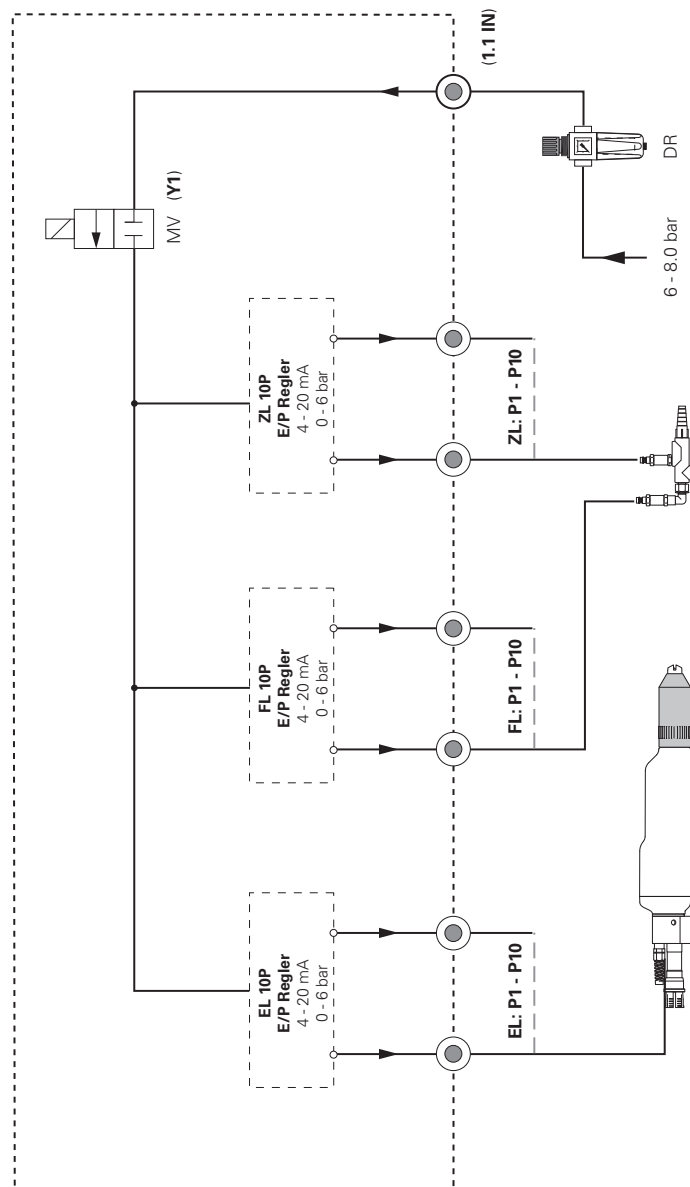
Pin	Function
1	GND
2	+24 VDC
3	Conveying air preset value
4	Conveying air actual value
5	Supplementary air preset value
6	Supplementary air actual value
7	Electrode rinsing air preset value
8	Electrode rinsing air actual value
9	MultiAir main solenoid valve ON
10	MultiAir main solenoid valve OK
11	not used
12	not used

DigitalBus (19 pin socket Aux - 2.5)

Pin	Bit	Function (binary value)
A	1 IN-D0	Preset values, program no. - binary value 2^0 (=1)
B	2 IN-D1	Preset values, program no. - binary value 2^1 (=2)
C	3 IN-D2	Preset values, program no. - binary value 2^2 (=4)
D	4 IN-D3	Preset values, program no. - binary value 2^3 (=8)
E	5 IN-D4	Preset values, program no. - binary value 2^4 (=16)
F	6 IN-D5	Preset values, program no. - binary value 2^5 (=32)
G	7 IN-D6	Preset values, program no. - binary value 2^6 (=64)
H	8 IN-D7	Preset values, program no. - binary value 2^7 (=128)
J	9 IN-A0	Identification number - binary value 2^0 (=1)
K	10 IN-A1	Identification number - binary value 2^1 (=2)
L	11 IN-A2	Identification number - binary value 2^2 (=4)
M	12 IN	System ON/OFF (gun release)
N	13 IN	Strobe (data transfer from data bus)
O	14 IN	Remote/manual
P	15 IN	Reserve-IN
R	16 IN	GND_External
S	1 OUT	Composite error message (signal - Error)
T		
U		24 VDC external
Enclosure		Shield

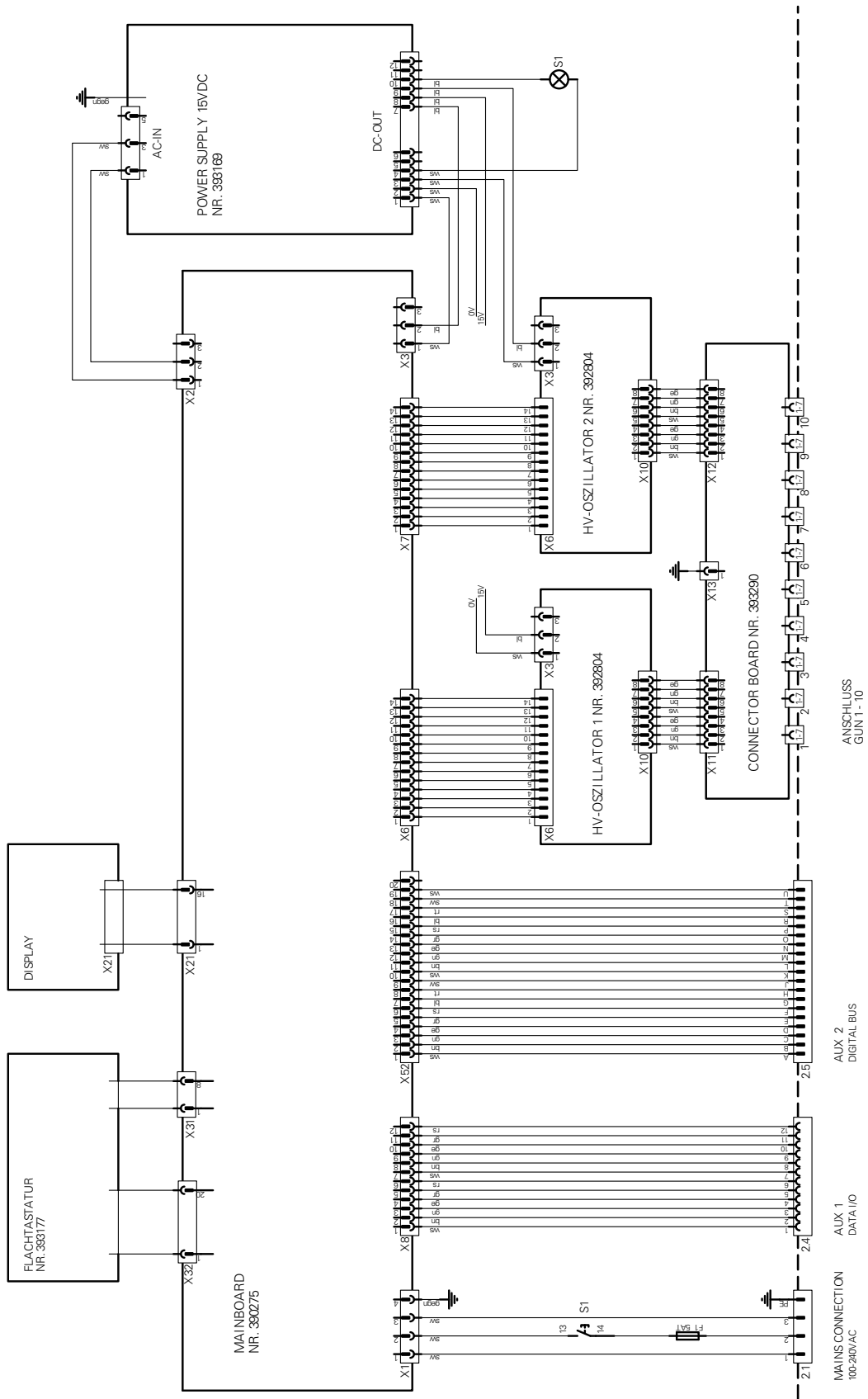
Schematic diagrams

MultiAir Pneumatic control unit - pneumatic diagram



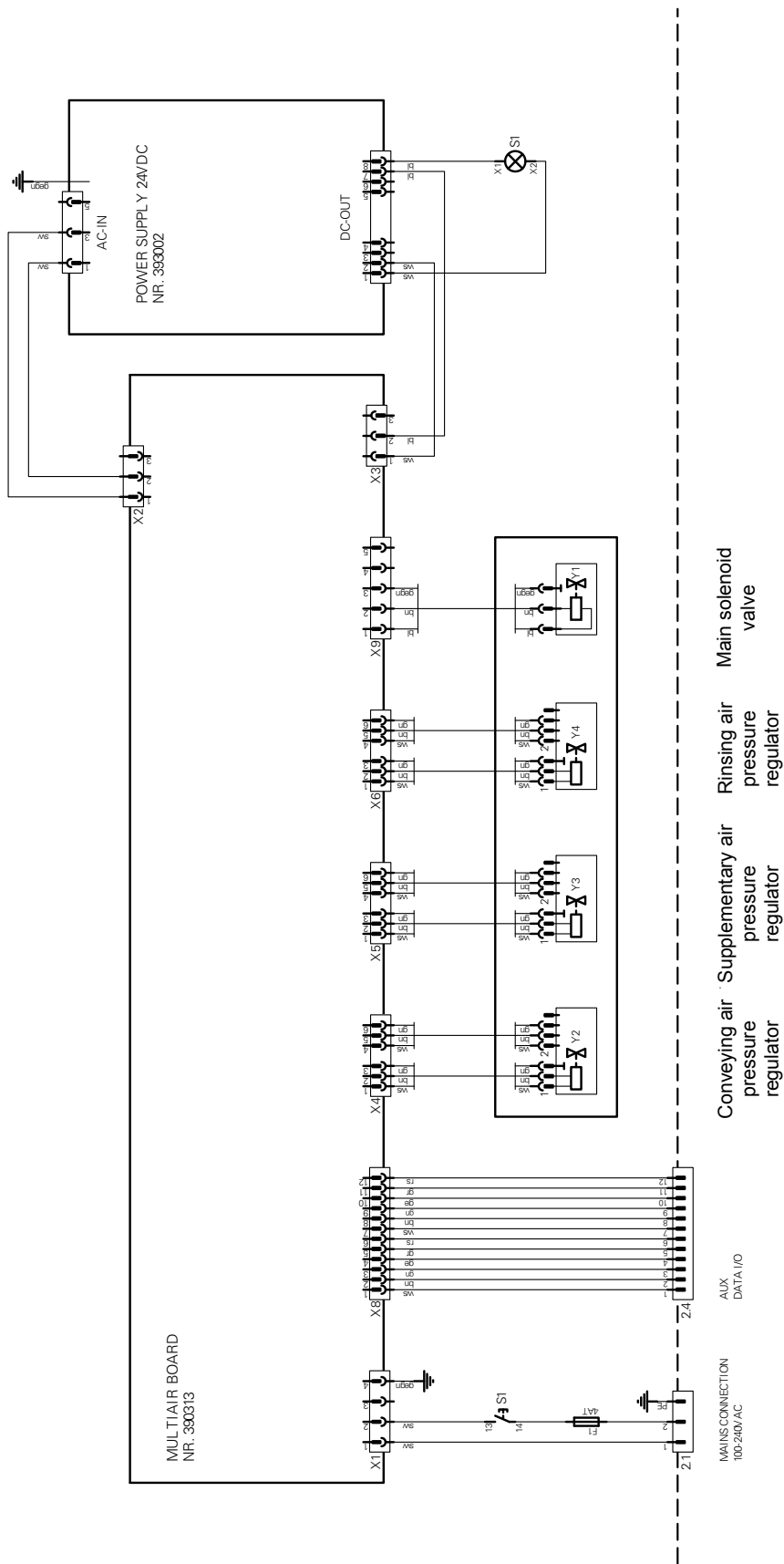
MultiAir Pneumatic control unit - pneumatic diagram

MultiTronic CG04 Control unit - wiring diagram



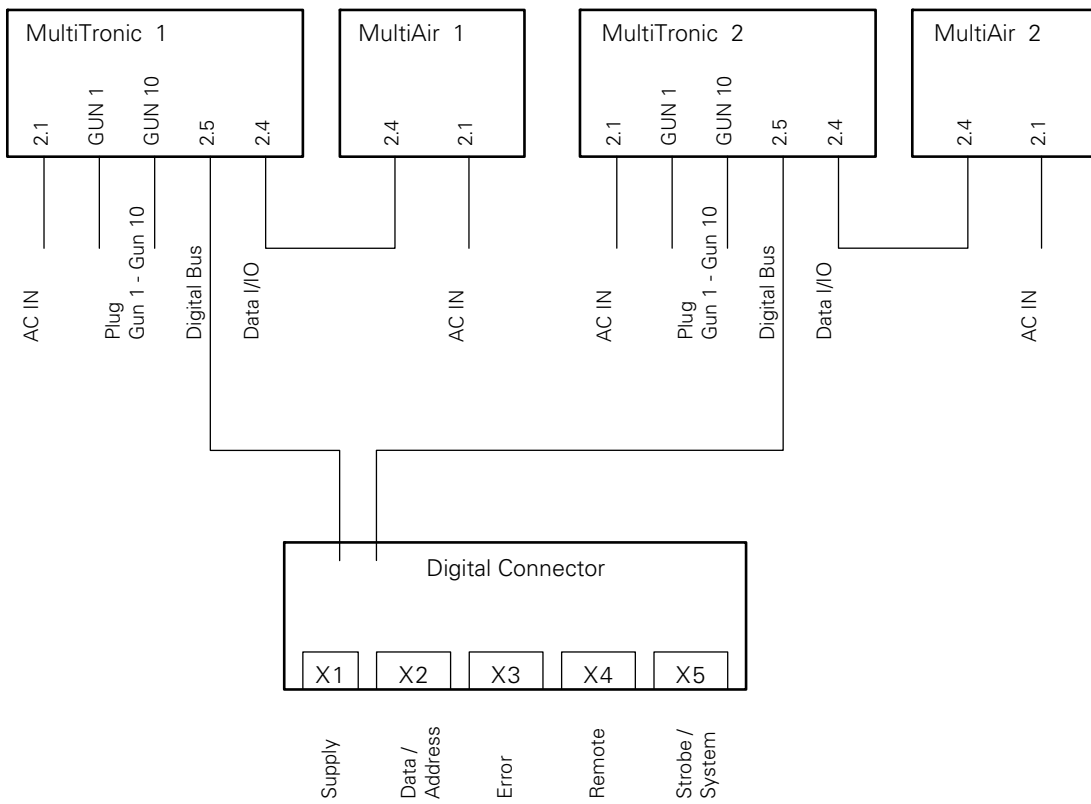
MultiTronic CG04 Control unit - wiring diagram

MultiAir Pneumatic control unit - wiring diagram



MultiAir Pneumatic control unit - wiring diagram

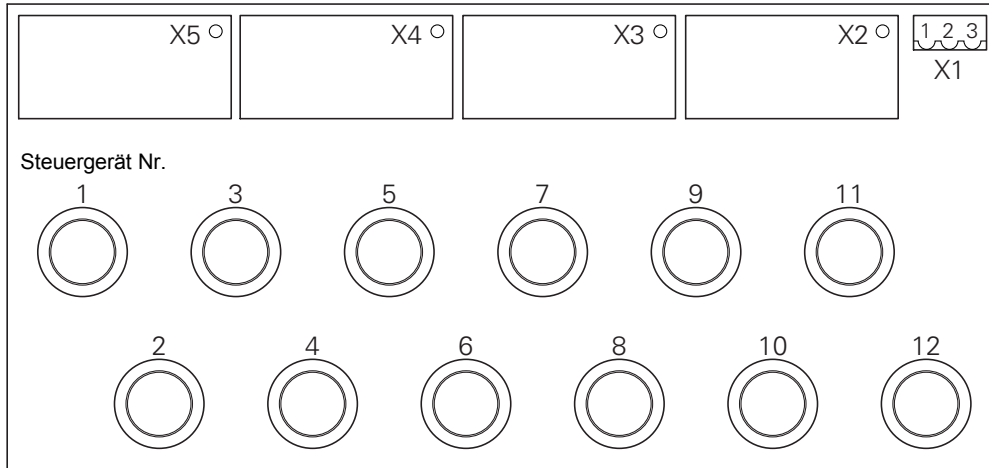
MultiTronic system with Digital Connector



MultiTronic system with Digital Connector

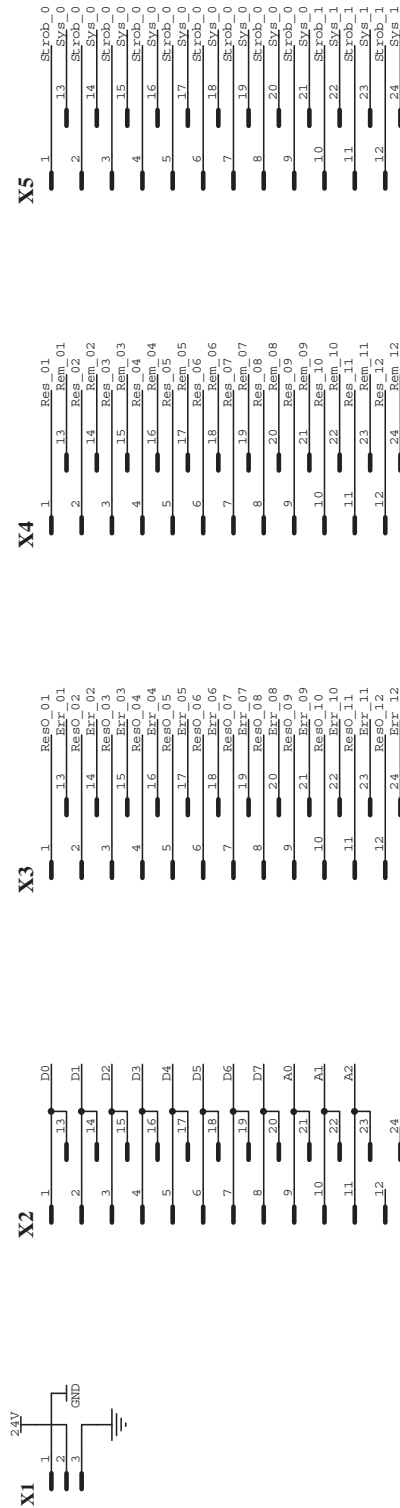
Digital Connector CD02 with connection designations

X5	X4	X3	X2	X1
1-12 Strobe	1-12 not used	1-12 not used	1-8/13-20 D0-D7	1: GND
13-24 System	13-24 Remote/man.	13-24 Error/not ref.	9-11/21-23 A0-A2	2: +24 VDC
				3: PE



Digital Connector CD02 with connection designations

Digital Connector CD02 - plug X1-X5



Digital Connector CD02 - plug X1-X5

External power supply
24 VDC
for every digital
input / output

Data bus - 11 bit
8 bits for preset values
3 bits for ID-no.

Guns 1-12
Composite error messages

Guns 1-12
Remote

Guns 1-12
System ON/OFF
Strobe

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** MultiTronic CG04/MultiAir
Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

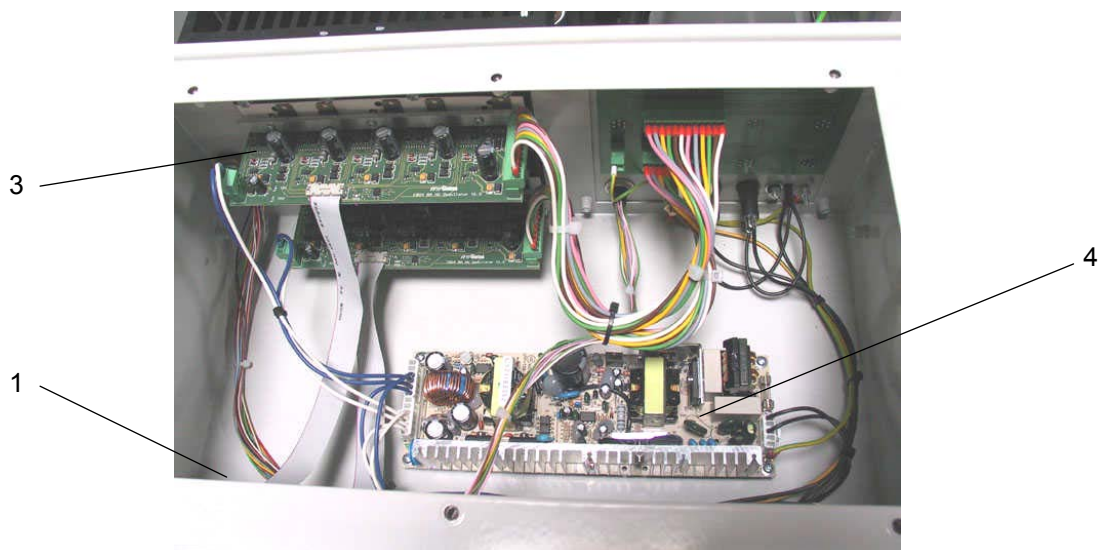


WARNING!

Only original Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

MultiTronic CG04 Control unit - spare parts list

	MultiTronic CG04 - complete	393 339
1	MultiTronic CG04 circuit board - complete	390 275
1.1	EPROM with MultiTronic CG04 software	393 134
2	Front frame with foil keyboard and electronics	393 266
3	Oscillator card for 5 guns - complete	392 804
4	Power pack 15 VDC - complete	393 169
5	MultiTronic/MultiAir connecting cable (not shown)	393 398
6	Mains cable - 2.5 m (not shown)	389 358
	Mains cable - 6 m (not shown)	390 119
	Mains cable - 20 m (not shown)	390 127
10	Illuminated push button - yellow	262 820
11	Fixing flange	262 838
12	Standard auxiliary switch	262 854
	Fuse - 5 AT	200 166



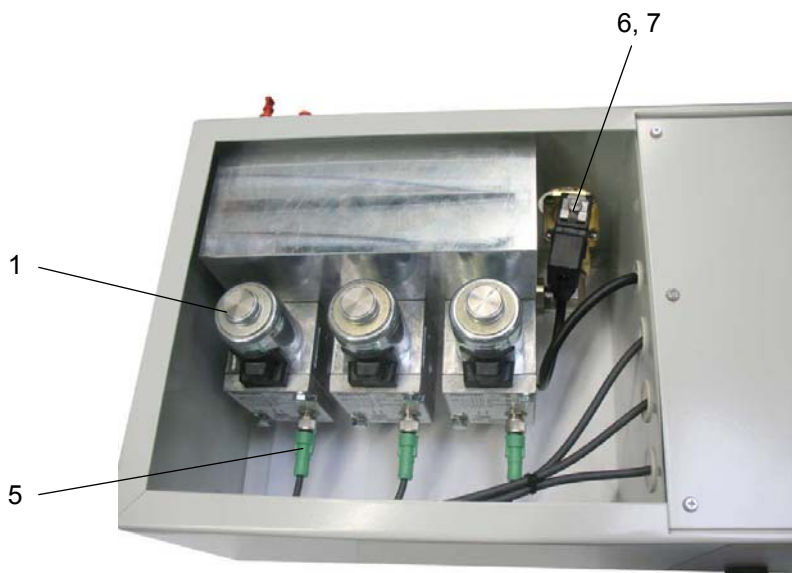
MultiTronic CG04 Control unit - spare parts

MultiAir Pneumatic control unit - spare parts list

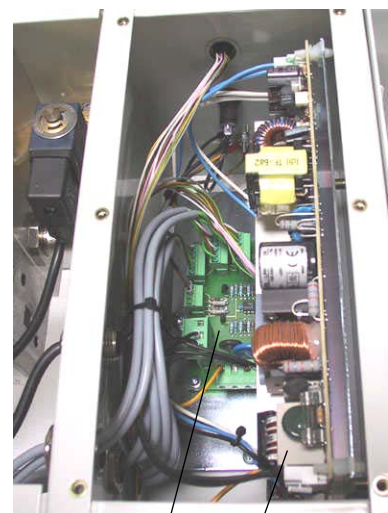
	MultiAir Pneumatic control unit - complete	392 820
1	Pressure regulator	266 787
2	Power pack	393 002
3	MultiAir circuit board - complete	390 313
5	Cable for pressure regulator	1007 262
6	MultiAir valve cable	393 061
7	Solenoid valve - 24 VDC, 1/2", NW 11.5 mm	259 195
10	Illuminated push button - yellow	262 820
11	Fixing flange	262 838
12	Standard auxiliary switch	262 854
	Fuse - 4 AT	200 182



10, 11, 12



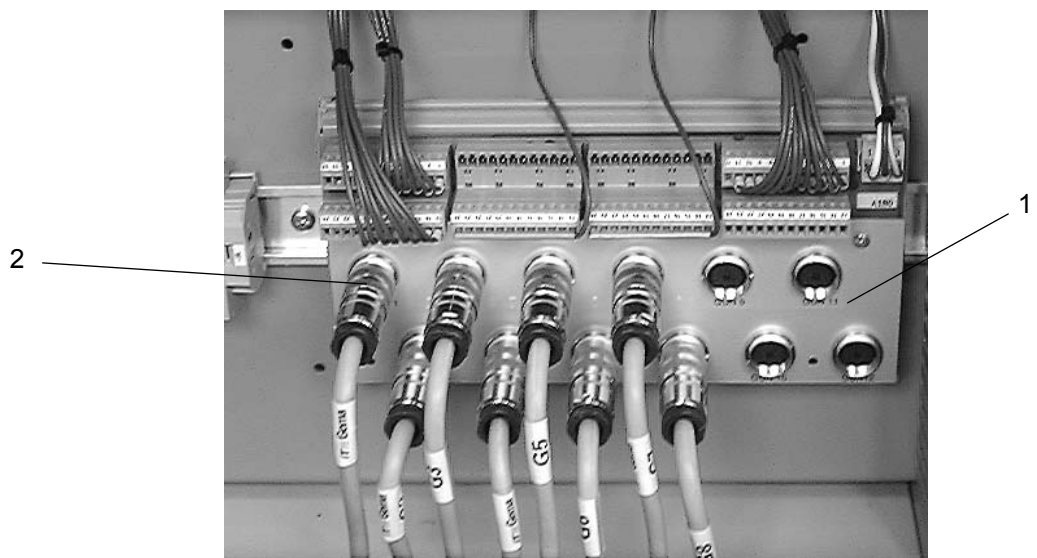
Pneumatikeinheit MultiAir - Ersatzteile



3 2

Digital Connector CD02 - spare parts list

1	Digital Connector CD02 (for 12 MultiTronic CG04 Control units)	382 825
2	Connecting cable - 3.5 m, 19 pins	1000 933
	Connecting cable - 4.5 m, 19 pins	1000 934
	Connecting cable - 5.5 m, 19 pins	1000 935
	Connecting cable - 6.5 m, 19 pins	1000 936



Digital Connector CD02 - spare parts

